REMARKS

Claims 1 and 10 have been amended. Claim 32 has been cancelled.

Claims 1-6, 9-15 and 18 were rejected under 35 USC 102(b) as being anticipated by Ulybin (SU 1619279). Claims 7 and 16 were rejected under 35 USC 103(a) as being unpatentable over Ulybin and further in view of Pierret et al. (US Patent No. 5,079,496) ("Pierre"). Claims 8 and 17 were rejected under 35 USC 103(a) as being unpatentable over Ulybin and further in view of Aslin et al. (US Patent No. 4,943,919) ("Aslin"). Applicants have amended independent claims 1 10 and with respect to these claim, and their respective dependent claims, the Examiner's rejection is respectfully traversed.

There are three main features of Applicants' invention which distinguish over the cited references. They are as follows:

A. Normal Operation. A plurality of fault-monitoring devices are coupled to a system to be monitored. When there is a fault in the system monitored, an appropriate signal is input to a first input of one of the fault monitoring devices. That fault monitoring device generates an output signal which is called herein a fault signal. This fault signal is cascaded through the fault monitoring devices until it appears as an output on the last one of the cascaded fault monitoring devices. This is the normal operation of the system.

B. Self Test Mode. Each fault monitoring device has a second input connected to the output of a preceding fault monitoring device. In a self-test mode, the electronic system induces a fault monitoring device to output a fault signal that is cascaded to the second input of the subsequent fault monitoring devices until it appears as an output of the last of the cascaded fault monitoring devices.

C. The Record. The fault signal output of the last of the fault monitoring devices creates a record. In normal mode, this record indicates that there is a fault in the system being monitored. In self test mode, this record indicates that the fault monitoring devices are all operable.

Normal Operation

Ulybin does not teach or suggest a plurality of fault monitoring devices coupled to a system to be monitored that detects a fault in the monitored system. Rather, Ulybin discloses a fault insertion device used to purposely insert faults into an ongoing calculation on a computing system to test the fault tolerance of the computing system. Page 2, Lines 17-18. As shown in Fig. 1, Ulybin discloses the fault insertion device 20 including inputs 11 and 12 providing the computing system's current page address. Input 9 providing a fault insertion address defining where in the ongoing calculation a fault simulation signal is to be inserted. Input 10 providing the fault simulation signal that is to be inserted into the ongoing calculation. Lastly, inputs 14 and 15 providing synchronization signals from other fault insertion devices in the cascade that are necessary to connect multiple fault insertion devices 20 in series. Therefore, Ulybin discloses a current page address input, a fault insertion address, a fault simulation signal input and cascade inputs. However, Ulybin does not teach or suggest any input signal which would indicate that either an expected or an unexpected fault has occurred in the computing system.

In reference to the normal operation feature of the present application, the Examiner states that "Applicant's specification discloses a self-test system and that claims recite 'simulate a fault condition'" and also states that "the claims and only the claims form the metes and

bounds of the invention." Office Action, page 9, lines 21-23. Applicants respectfully disagrees with the Examiner's implication that the claims do not recite the fault-monitoring device monitoring for a fault in a system other than the fault-monitoring devices themselves. Specifically, Applicants note that amended claim 1 recites:

> "a plurality of fault-monitoring devices each of which is adapted to have a respective first input from the system to be monitored and an output for outputting a fault signal when a respective first input indicates that the system to be monitored is in a fault condition."

This limitation is in addition to the "simulate a fault condition" limitation referred to by the Examiner and now recited in amended claim 1 as:

> "the fault-monitoring devices are arranged in a cascade fashion, a fault-monitoring device having a second input connected to the output of a preceding fault-monitoring device; the electronic system being adapted induce a fault-monitoring device of the cascade to output a fault signal, which signal is cascaded as an input to the second input of a subsequent fault-monitoring."

Therefore, in addition to the inducement of a fault in one of the fault-monitoring devices to test the operation of subsequent fault-monitoring devices in the cascade, claim 1 also recites each fault-monitoring device having a first input from a system to be monitored, the first input providing an indication that a fault has occurred in the monitored system.

Accordingly, Ulybin does not teach or suggest a plurality of fault-monitoring devices coupled to a system to be monitored wherein when there is a fault in the monitored system, an appropriate signal is input to a first input of one of the fault monitoring devices and the fault monitoring device generates a fault signal.

Self Test Mode

Ulybin does not teach or suggest multiple cascaded fault-monitoring devices, the electronic system inducing a fault-monitoring device to output a fault signal that is cascaded through subsequent fault-monitoring device in the cascade, the absence of the fault signal from the last fault-monitoring device indicating a fault with a fault-monitoring device. Rather, Ulybin discloses connecting multiple fault insertion devices in series to provide for more precise definition of the insertion point with the ongoing calculation. Page 3, Lines 23-24. As shown in Fig.2, Ulybin discloses a cascade of fault insertion devices including cascade outputs 16 and 17 on each fault insertion device connected to cascade inputs 14 and 15 on a neighboring fault insertion device in the cascade. These cascade outputs provide for the synchronization of the multiple fault insertion devices in the cascade with the ongoing calculation on the computation system. Ulybin also discloses connecting the fault simulation signal output 13 from the last fault insertion device in the cascade to cascade input 15 of the last device and input 14 of the first device. This connection provides for an optional automatic modification of the fault insertion address. Therefore, Ulybin discloses connecting cascade outputs to neighboring cascade inputs for synchronization purposes and connecting the fault simulation signal output of the last device to the cascade inputs of the last and first devices for automatic modification of the insertion address. However, Ulybin does not disclose a fault insertion device induced to output a signal which is then cascaded through subsequent fault insertion devices and whose absence from the last fault insertion device indicates a fault with a fault insertion device.

In reference to the self test mode feature, the Examiner states that "limitations cannot be read into the claims for the purpose of avoiding prior art" and that "the fault insertion of the prior art is an 'indicator' a fault condition using a daisy-chained fault signaling system." Office

Action, page 10, lines 11-15. Applicants respectfully disagrees with Examiner's implication that the claims do not recite a fault signal that is induced in a fault-monitoring device, cascaded through subsequent fault-monitoring devices and generates an fault signal output in the last fault-monitoring device that provides an indication of fault in a fault-monitoring device. Specifically, Applicants note that amended claim 1 now recites:

> "the electronic system being arranged to determine whether there is a fault with a fault-monitoring device by being arranged to create a record of a fault from the output of the final fault-monitoring device, the absence of a record being created when the electronic system induces a fault signal output signifying a fault in one of the fault-monitoring devices."

The induced fault signal, as recited in amended claim 1, is not simply an 'indicator' of a purposely initiated fault condition but, rather, is an indicator of an actual fault in a fault-monitoring device. Therefore, Ulybin does not teach or suggest multiple cascaded fault-monitoring devices, the electronic system inducing a fault-monitoring device to output a fault signal that is cascaded through subsequent fault-monitoring device in the cascade, the absence of the fault signal from the last fault-monitoring device indicating a fault with a fault-monitoring device as recited in claim 1.

The Record

Ulybin does not teach or suggest the creation of a record which, in a normal mode of operation, indicates that there is a fault in the system being monitored and, in a self test mode of operation, indicates that the fault-monitoring devices are all operable. As shown in Fig. 2,

Ulybin discloses that when the computing system's current page address (inputs 11, 12) is the same as the fault insertion address stored in the counter 1, the stored fault signal is read out of an impulse former 5 (output 15) and inserted into the ongoing calculation at the current page address on the computing system. See Fig. 1. Once the calculation is completed, the resulting product is evaluated by an undisclosed method to determine the fault tolerance of the computing system. Ulybin also discloses multiple cascade outputs (16, 17) reflecting the computing system's current page address providing for the connection of multiple fault-monitoring devices in series. Therefore, Ulybin discloses a stored fault signal output, multiple cascading outputs and a computational system's calculation output. However, Ulybin does not disclose the creation of a record in conjunction with any of the disclosed outputs.

Please note that in the normal operation of the present invention a record is provided only in response to a fault signal from one of the plurality of fault monitoring devices. But when in self test mode, an induced fault signal at one of the fault-monitoring devices results in a record only when the fault monitoring devices are all operating properly. Thus the record produced by the fault signal indicates something wrong in normal operation and the record produced by the induced fault signal indicates nothing wrong in self test mode. Conversely, the absence of a record means no underlying system fault in normal mode and the existence of a fault in the monitoring devices in self test mode. This seemingly contradictory use of the record provides an optimum interface with the user. In regular operation the user wants to be alerted when there is a fault in the underlying system. In test mode the user wants an affirmative indication that the monitoring devices are all in good shape.

Therefore, Ulybin does not teach or suggest the creation of a record in conjunction with any of the disclosed outputs which, in normal mode indicates that there is a fault in the system being monitored and, in self test mode, indicates that the fault monitoring devices are all operable.

Moreover, Pierre and Aslin fail to teach or suggest those features missing from Ulybin.

In light of the foregoing, reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,

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